REMARKS

Claims 1-8, 10-17 and 20-40 were pending in the above-identified application.

In the FINAL office action of June 10, 2003, claims 17, 20-23 and 26-32 were rejected, claims 4 and 24-25 were objected. Claims 1-3, 5-8, 10-16 and 33-40 were allowed.

In response, claim 17 has been amended, claims 4, 23 and 25 have been cancelled. Applicants maintain that no new matter has been added with this amendment.

Double Patenting

The Examiner objected to claim 7 under 37 CFR 1.75 as being a substantial duplicate of claim 4 and claim 23 as being a substantial duplicate of claim 20. In response, claims 4 and 20 have been canceled. Applicants submit this objection has been overcome and request that it be withdrawn.

§102 and §103 Rejections and Other Objections

Claims 17, 20-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Ikeda et al. (U.S. Patent No.: 6,441,451). Claims 26-28 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ikeda in view of Lin et al. (U.S. Patent No.: 6,483,147). Claims 29-32 also were rejected under 35 U.S.C. §103(a) as being unpatentable over Ikeda in view of Brosnihan et al. (U.S. Patent No.: 6,121,552). Claims 24-25 are objected as being dependent upon a rejected based claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants respectfully traverse these rejections.

In the field of micro electro-mechanical systems (MEMS), any trench that passes through a substrate by dry etching is inevitably enlarged in width at its terminal end. The present invention is directed to an etching method and a manufacturing method where dry etching is conducted by providing a conductor with a higher electric conductivity for making a through

hole at its terminal end. This especially affects fabrications of micro structures in semiconductors. Semiconductors are multi-layered structure. It is often desired to pierce only a certain layer through by etching. Since the through hole may enlarge at boundaries if respective layers are different in the etching rate, the effect of preventing undersirable enlargement at the terminal end can be obtained by providing a conductor at a location where the etching of the layer should be stopped.

Applicants have discovered that passing-through etching can be obtained without performing any particular processing on the part of the silicon substrate. This process does not require a conductive film, such as an Al film to be formed on the bottom of the silicon substrate; thus, simplifying the process. (Spec. pages 20-23).

Claim 17 recites a manufacturing method of a structure including a step of making a through hole by etching an object from a surface thereof by dry etching, comprising: the dry etching being conducted under the condition where a conductor with a higher electric conductivity than that of a silicon semiconductor is in contact with the silicon semiconductor at least in or near a location for making the through hole and, wherein the through hole is made by setting the conductor with a high melting point on a wafer stage in a dry etching apparatus.

In contrast, Ikeda discloses a different problem and solution than the Applicants' invention. Ikeda disclose the formation of a through hole (190) in the substrate (100) by dry etching using excess gases whose main component is sulfur hexafluroide (SF_6) excited by plasma and a metallic mask or a silicon oxide mask for causing less surface tension damage to the solvent when the etching liquid used to etch the sacrificial layer (60) and the cleaning solvent thereof are dried. (Col. 2, lines 18-22; Col. 7, lines 25-28). Ikeda does not disclose or even suggest a through hole that is made by setting the conductor with a high melting point on a wafer

stage in a dry etching apparatus which simplifies the whole process. Thus, Ikeda does not anticipate claim 17 of the present invention.

Applicants' claim 17 is allowable over Ikeda as discussed above. Because claims 21-23 and 26-32 depend from claim 17, they include all the limitations of claim 17. Thus, Applicants' invention is not render unpatentable under 35 U.S.C. § 103(a).

Accordingly, Applicants submit that the claim invention is neither anticipated by nor obvious over the applied references, either alone or in combination.

Applicants respectfully submit these rejections and objections have been overcome and request that they be withdrawn.

In view of the foregoing, it is submitted that the pending claims 17, 21-25 and 26-32 are patentable and that the application is in condition for allowance. Notice to that effect is respectfully requested.

Respectfully submitted,

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